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PROBLEMS.

107. BY R. J. ADCOCK.—If  $c = \sqrt{a^2 - b^2}$ , show that

$$\frac{a + c}{a - c} = \left( \frac{c + a - b}{c - a + b} \right)^2.$$

108. BY PROF. A. B. EVANS.—Employing the notation of Prob. 100, page 31, show by Finite Differences, or other otherwise, that

$$\frac{1}{a_x} \pm \frac{1}{a} = \frac{1}{b_x} \pm \frac{1}{b} = \frac{1}{c_x} \pm \frac{1}{c} = \frac{1}{6} \left( [5 + 2\sqrt{6}]^x + [5 - 2\sqrt{6}]^x \pm 2 \right) \left( \frac{1}{a} + \frac{1}{b} + \frac{1}{c} \right) + \frac{1}{2\sqrt{6}} \left( [5 + 2\sqrt{6}]^x - [5 - 2\sqrt{6}]^x \right) \left( \sqrt{\left[ \frac{2}{ab} + \frac{2}{ac} + \frac{2}{bc} \right]} \right); \text{ where the double sign is to be taken plus when } x \text{ is odd and minus when } x \text{ is even.}$$

109. BY PROF. A. HALL.—Show that the determinant

$$\begin{vmatrix} a & b & c & d \\ b & a & d & c \\ c & d & a & b \\ d & c & b & a \end{vmatrix}$$

is divisible by  $(a + b)^2 - (c + d)^2$ ; and by  $(a - b)^2 - (c - d)^2$ .

110. BY E. B. SEITZ.—A circle, radius  $r$ , is placed at random on another equal circle. Prove that the average area of the greatest ellipse that can be inscribed in the area common to the two circles, is  $\pi r^2 (\frac{1}{2}\pi - \frac{4}{3})$ .

PUBLICATIONS RECEIVED.—We have received various Educational Periodicals for which we tender our thanks, though our space will not permit us even to name them in detail. We desire however to call the attention of our readers, especially of engineers and surveyors, to *ENGINEERING NEWS*; a publication issued at Chicago, by Geo. H. Frost, Editor and Publisher.

*ENGINEERING NEWS* commenced its third Vol., Jan. 1st, 1876, as a *Weekly*, having been published two years as a *Monthly*. It will be found to be a really interesting and valuable publication, and, dealing with all questions of practical engineering, it should be in the hands of every practical engineer and surveyor.

ERRATA.

On page 35, line 9, from bottom, transpose  $a, b$ .

“ “ 37, “ 17, after the word expression, insert, of  $e'$ .

“ “ 37, “ 10, from bottom, change  $e$  to  $e'$ .

“ “ 38, “ 4, change  $Fx$  into  $fx$ .

“ “ 38, “ 6, 7, from bottom, change  $Fx$  and  $Ft$  to  $(Fx)$  and  $(Ft)$ .

“ “ 45, “ 13, from bottom, for  $AOC'$  read  $OAC'$ .

“ “ 45, “ 12, “ “ “  $AOP'$  “  $OAP'$ .

“ “ 49, “ 24, should be,  $p_n^2 + b_n^2 = h_n^2$ .